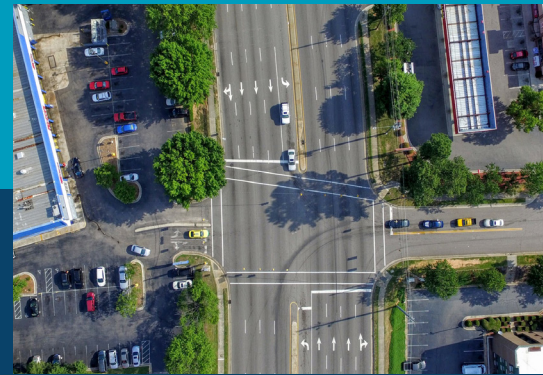


Capital Blvd North

Corridor Study



Travel Profile Report

June 2019



raleighnc.gov



Contents

Introduction	4
Vehicle Traffic	4
Crash Analysis	17
Equity	20
Bicycles and Pedestrians	22
Transit	28
Existing Plans	32

Introduction

The focal point of the Travel Profile report is understanding the existing and future transportation conditions of the Capital Boulevard North corridor. This understanding will assist in evaluating viable solutions for achieving the corridor's vision. The core of the analysis presented here is the travel patterns of private vehicles. Next, demographic information has been compiled to illuminate existing equity disparities and equity impacts of proposed transportation changes. Finally, transit, bicycle, and pedestrian facilities are inventoried to ensure that future improvements have multi-modal benefits.

The analysis of demographics and existing travel conditions is provided to understand the contexts of the study corridor within the Triangle region. This context-setting discussion illuminates the following items:

- who is likely to be traveling the corridor and for what purposes;
- who is most likely to be affected by potential transportation, land use, and technology changes within the corridor;
- and how local and regional development patterns interact with the highway network to influence the travel demand for the study

corridor.

It raises key issues to consider when developing and evaluating alternative visions and strategies for improving the corridor.

Traffic

The traffic analysis was undertaken using a three-tiered approach where the context of the corridor is first explored at a regional level, then at a focused corridor level, and finally at the site and segment level. This report summarizes the findings of that analysis.

Regional Analysis

The Triangle Regional Model (TRM) is the official travel demand modeling and analysis tool for the Triangle region of North Carolina. TRM is used to predict existing and future travel behavior based on factors that include population and employment density, socioeconomic data, and roadway and transit facilities. Expected future changes to these factors are built into the model when developing forecasts of travel demand.

Streetlight is a web-based tool used to analyze existing travel patterns based on cellphone locations. Streetlight data is more detailed than the TRM in terms of time and geography, but its



Location	Traffic Forecast	Daily Through trips	Through Trips %	Peak Hour Through Trips	Peak hour %
<i>Capital Blvd at I-440</i>	78,000	24,527	31.4%	2,207	9%
<i>Capital Blvd at I-540</i>	70,000	14,059	20.1%	1,406	10%
<i>Louisburg Rd at I-540</i>	42,000	11,677	27.8%	1,284	11%

Traffic Forecast and Peak hour percentage based on Traffic Forecast Report
Through trips percentage calculated from StreetLight Index TM

use is limited to existing and past travel patterns of passenger cars and commercial vehicles.

When conducting the regional analysis, both Triangle Regional Model and Streetlight data were used. The Triangle Regional Model is the primarily-used transportation model for the Triangle region of North Carolina. Streetlight data was also used to confirm the data from the Triangle Regional Model. The two data sets were very similar in their outputs, which allowed the Triangle Regional Model to be confirmed for use in the Capital Boulevard North study. Because the two models matched closely, the Streetlight data could also be used where any information was lacking in the Triangle Regional Model.

Capital Boulevard is a major north-south corridor in Raleigh. While there are many local destinations along the corridor, a large portion of the drivers on Capital Boulevard are passing through. These "through" trips are external to external, meaning both their origin and destination are outside of the corridor study area, but travel through the corridor at some point during their trip.

Through trips can be contrasted with "to" trips. "To" trips may be external to internal, internal to external, or internal to internal trips. These are trips with either an origin or destination, or both origin and destination, within the study area. The table above highlights the number of north-south through trips along the corridor.

The "Capital Boulevard at I-440" row represents trips that either start at I-440 and go to either of the two other external locations listed (Capital Boulevard at I-540 or Louisburg Road at I-540) or vice versa with trips starting at one of the two other

locations and ending at I-440. For the other two rows, "Capital Boulevard at I-540" and "Louisburg Road at I-540" are the starting locations and they on go to I-440 or vice versa with trips starting from I-440 and ending at either of the two locations.

The regional analysis is also important for understanding the types of vehicle trips that are made within the corridor. The regional analysis identifies trips in the corridor as:

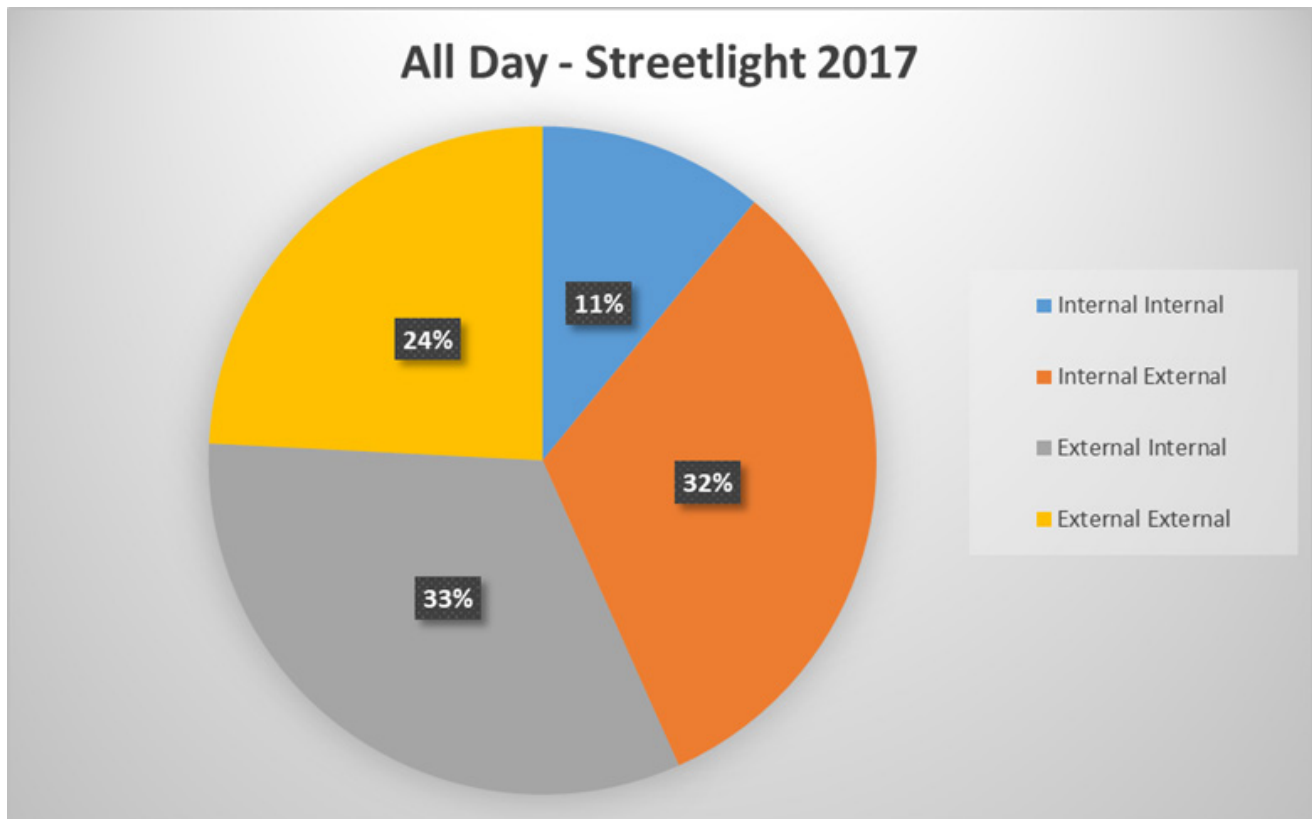
- completely internal to the corridor study area (Internal to Internal);
- trips that begin within the corridor study area, but have destinations outside of the study area (Internal to External);
- trips that begin outside of the corridor study area, but have destinations inside the study area (External to Internal);
- and finally, trips that both begin and end outside of the corridor study area, using the corridor as a part of their travel path (External to External).

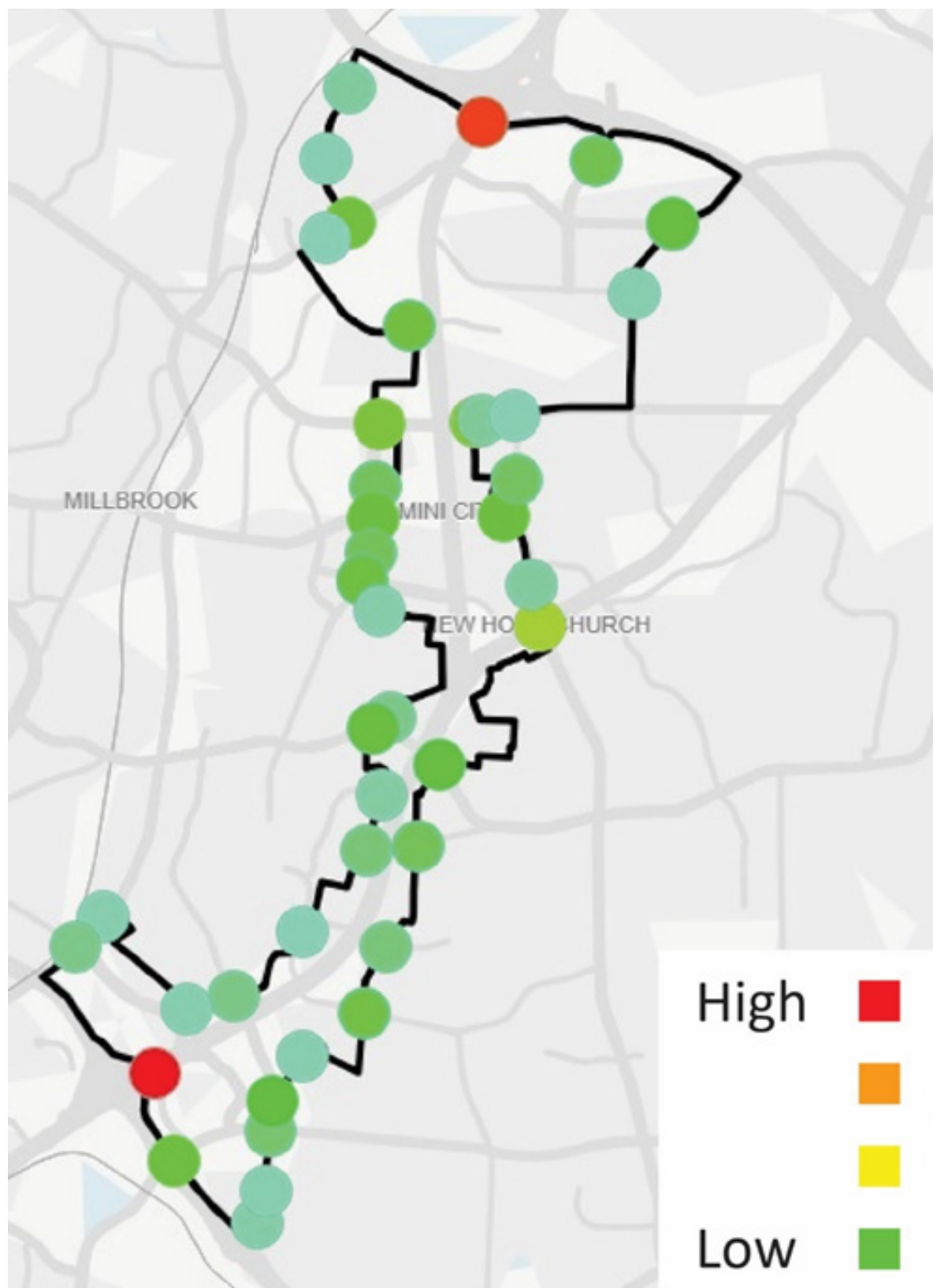
This analysis is useful for understanding the importance of the corridor within the region and identifying geographic subareas that depend most heavily on Capital Boulevard to serve local travel needs. This section describes the corridor within the context of this analysis.

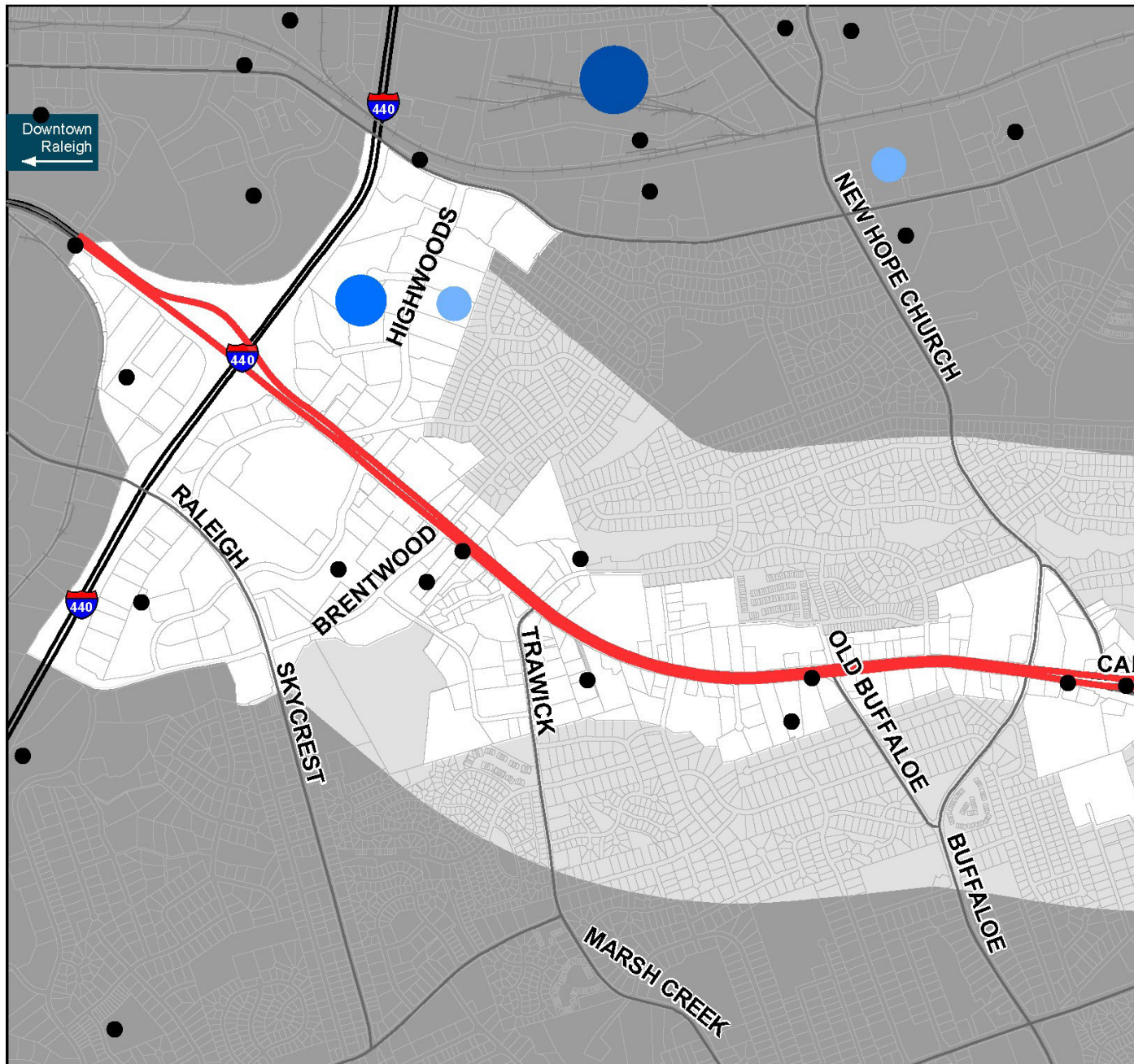
The pie chart on page 6 highlights the trip patterns on Capital Boulevard. As indicated in the chart, 24 percent of the trips on Capital Boulevard are external to external and 11 percent of trips were internal to internal. The largest percentage of trips were external to internal and internal to external. These two categories together account for 75

percent of all trips on the corridor. This means that three of every four trips either start or end in the study area but also involves travel outside the study area. Pairing this with the "gate" map on page 7, highlights the importance of cross street connections in the study area.

Using Streetlight, "Gates" were established at all the streets leading into the study area. These "gates" indicate the volume of trips that enter the corridor from that specific location. The map below shows that the highest volume of trips entering the







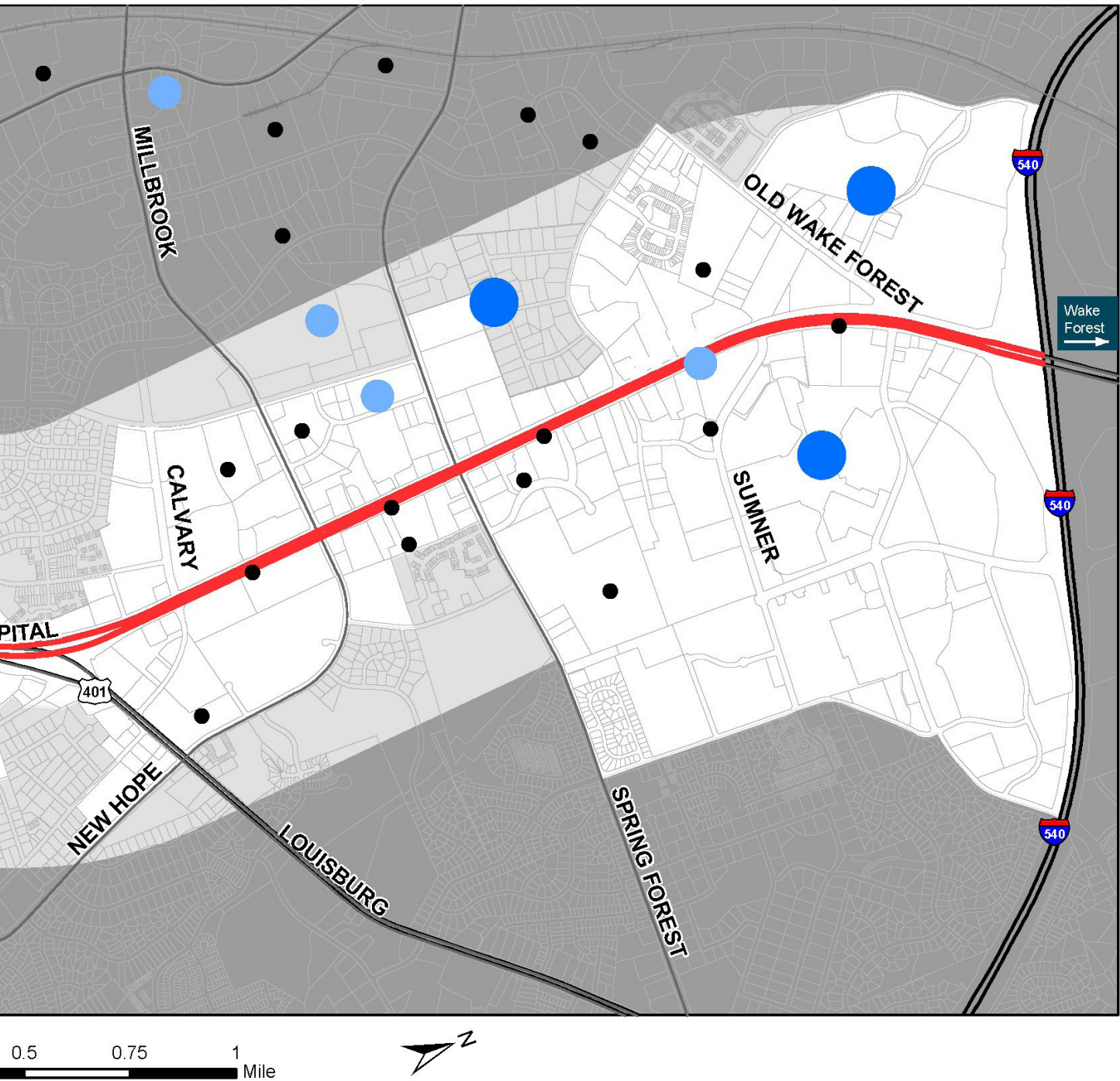
**Workplace Locations for Wake Forest Residents
(Number of Employees)**
Source: 2015 OnTheMap LEHD Census Data

— Capital Boulevard North Corridor

- 10 - 50 Employees
- 51 - 100 Employees
- 101 - 300 Employees
- > 300 Employees

— Railroads
— Study Area
— Area of Influence

0 0.25



corridor pass through the interchanges of I-440 and I-540.

There is a significantly lower number of trips entering the corridor from other locations, and the trip volumes at these locations are similar in magnitude. This indicates that, aside from the I-540 and I-440 interchanges, trips are somewhat evenly dispersed throughout the network of streets that surround Capital Boulevard. The data indicate that it will be important to consider the entire network when developing transportation alternatives rather than focusing on a few intersections.

Using The Town of Wake Forest as an example of

where through trips may have originated, the map on pages 8 and 9 highlights where the citizens of Wake Forest work. As indicated in the map, many citizens of Wake Forest work along the Capital Boulevard Corridor. One of the large clusters is in Midtown, near the Duke Raleigh Hospital. Another cluster is near North Hills. As with the "gate" map on page 7, this map shows that that an individual travelling from Wake Forest has a number of ways to reach the Midtown and North Hills area by using Capital Boulevard because there are many cross streets that allow for east-west connections.

Location	ROUTE	AADT_2003*	AADT_2007*	AADT_2009*	AADT_2017*
Capital Blvd North of I-440 Interchange	US 1-401	72,000	68,000	75,000	76,000
Capital Blvd South of Brentwood Road	US 1-401	65,000	63,000	71,000	72,000
Capital Blvd South of Trawick Road	US 1-401	58,000	66,000	70,000	83,000
Capital Blvd North of Trawick Road	US 1-401	66,000	62,000	66,000	69,000
Capital Blvd South of Old Buffalo Road	US 1-401	62,000	61,000	67,000	72,000
Capital Blvd North of Buffalo Road	US 1-401	70,000	60,000		65,000
Capital Blvd North of Louisburg Road	US 1				44,000
Capital Blvd South of Millbrook Road	US 1	46,000	41,000	43,000	40,000
Capital Blvd South of Spring Forest Road	US 1	51,000	48,000	49,000	48,000
Capital Blvd North of Spring Forest Road	US 1	52,000	50,000	50,000	53,000
Capital Blvd South of Old Wake Forest Road	US 1	44,000	45,000	45,000	51,000
Capital Blvd South of I-540 Interchange	US 1				60,000
I-540 West of Capital Blvd	I-540	20,000	72,000	72,000	85,000
I-540 East of Capital Blvd	I-540	7,900	55,000	58,000	76,000
I-440 West of Capital Blvd	I-440	113,000	113,000	108,000	132,000
I-440 East of Capital Blvd	I-440	96,000	97,000	92,000	114,000

*Vehicles per day



Corridor Analysis

Past Traffic Counts

The corridor analysis adds more detail about the local street network that connects to Capital Boulevard. The chart below shows the average annual daily traffic (AADT) on the corridor at major cross streets. This information is also shown in chart form on pages 12 and 13. The AADT data show recorded volumes along the road for four historical years. For the years shown, traffic tends to be heaviest towards I-440 and decreases along the corridor towards I-540, but then increases slightly as Capital Boulevard approaches I-540.

Traffic Forecast

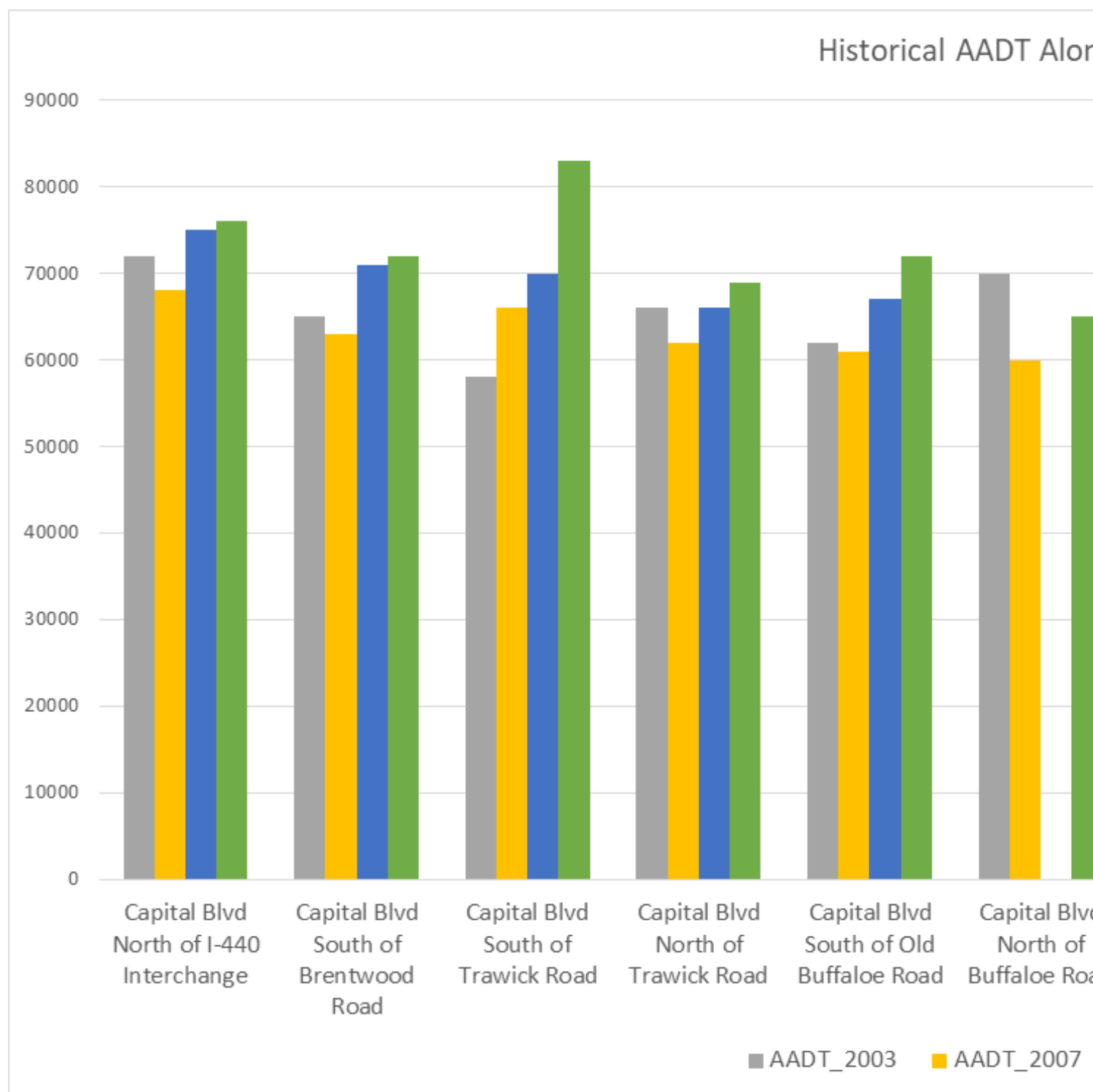
A traffic forecast was prepared by WSP in January 2019 (See Appendix A) for the Capital Boulevard corridor from I-440 to I-540 using the existing, approved NDCOT Transportation Planning Division forecasts: FS-1805A (May 2018), I-5970 (November 2018) and U-5307 (June 2017).

In addition, new count data was collected at the intersections of Capital Boulevard at Oak Forest Road and Greywood Road in September 2018. The 2018 volumes at these two intersections were developed based on turning movement counts that were collected for this forecast.

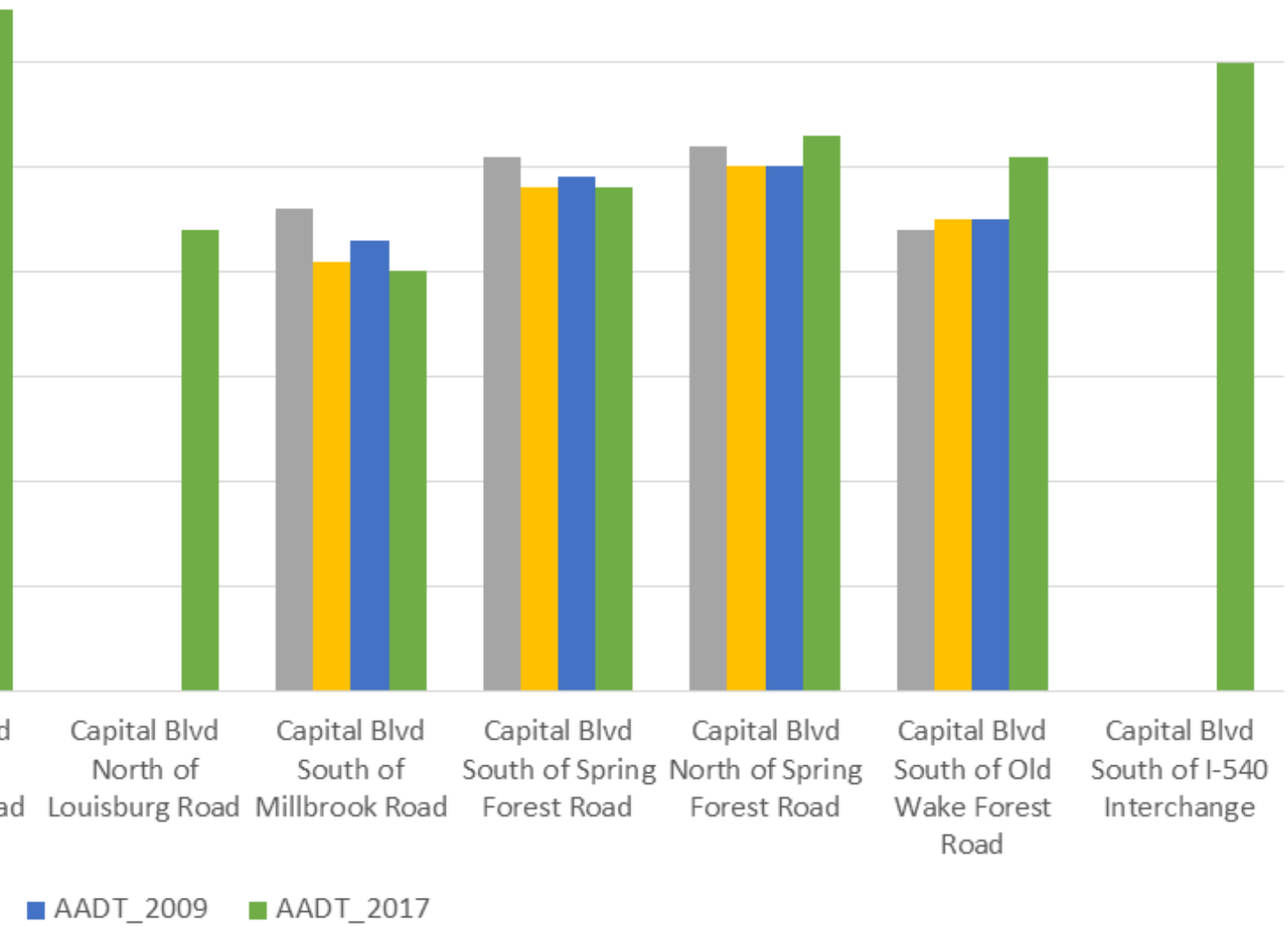
The tables on pages 14 and 15 show the forecasted traffic volumes along Capital Boulevard and major cross streets for both the year 2018 and 2045. This information is presented in diagram form in the Appendix. Traffic volume at each of the locations listed in the table is forecast to increase between 2018 and 2045, with the volume growth in many locations expected to be substantial.

The 2045 volumes were developed by assuming a growth rate for the 2018 volumes that is consistent with the growth rates used in the previously approved forecasts. The traffic forecast provides Average Annual Daily Traffic (AADT) volumes, design hourly factors, peak hour directional split percentages, PM peak direction of flow, and heavy vehicle percentages.

Using the projected 2045 future year peak hour volumes, a capacity analysis was completed for major cross streets using the Federal Highway Administration's (FHWA) Capacity Analysis for Planning of Junctions (Cap-X) software tool. Cap-X was developed by FHWA to identify the types of intersections and interchanges that are likely to be able to accommodate predicted traffic volumes and eliminate infeasible alternatives at an early stage of the planning process. Cap-X evaluates the feasibility of an intersection or interchange based on two metrics, called Volume to Capacity (V/C) Ratio and Critical Lane Volume.



ing Capital Boulevard



High volume intersections were analyzed for the Cap-X analysis. Using the 2045 traffic forecast, AM and PM peak hour turning movement volumes were developed using NCDOT Congestion Management Section's Intersection Analysis Utility (IAU) tool for the following locations:

- US 1 (Capital Boulevard) at Old Wake Forest Road
- US 1 (Capital Boulevard) at Johnson Lexus Driveway/Sumner Boulevard
- US 1 (Capital Boulevard) at Oak Forest Road
- US 1 (Capital Boulevard) at Spring Forest Road
- US 1 (Capital Boulevard) at Millbrook Road
- US 1 (Capital Boulevard) at Calvary Road
- US 1 (Capital Boulevard) at New Hope Church Road/Bufaloe Rd
- US 1 (Capital Boulevard) at Huntleigh Drive/Trawick Road
- US 1 (Capital Boulevard) at Brentwood Road
- US 1 (Capital Boulevard) at Highwoods Boulevard1

ROUTE	LOCATION	2018 AADT	2045 AADT
Capital Blvd			
Capital Blvd	NORTH of I-540	74,000	109,600
Capital Blvd	NORTH of Old Wake Forest Rd	70,000	92,800
Capital Blvd	NORTH of Sumner Blvd	56,800	63,600
Capital Blvd	NORTH of Oak Forest Rd	61,200	75,200
Capital Blvd	NORTH of Spring Forest Rd	62,800	77,200
Capital Blvd	NORTH of Millbrook Rd	57,200	78,800
Capital Blvd	NORTH of Calvary Dr	49,200	73,600
Capital Blvd	NORTH of US 401	47,600	72,800
Capital Blvd	NORTH of Buffalo Rd	77,600	115,200
Capital Blvd	NORTH of Greywood Rd	74,000	113,600
Capital Blvd	NORTH of Old Buffalo Rd	73,600	113,200
Capital Blvd	NORTH of Starmount Dr	78,400	113,200
Capital Blvd	NORTH of Trawick Rd	76,000	118,000
Capital Blvd	NORTH of Brentwood Rd	80,400	124,400
Capital Blvd	NORTH of I-40	78,000	119,600
Capital Blvd	SOUTH of I-40	42,000	71,600

Notes:

AADT - Annual Average Daily Traffic

Volumes are in vehicles per day (vpd)

ROUTE	LOCATION	2018 AADT	2045 AADT
Cross Streets (North to South)			
I-540	WEST of Capital Blvd	86,400	157,600
I-540	EAST of Capital Blvd	78,000	156,800
Old Wake Forest Rd	WEST of Capital Blvd	26,800	43,200
Old Wake Forest Rd	EAST of Capital Blvd	20,000	39,600
Johnson Lexus Dwy	WEST of Capital Blvd	2,400	12,000
Sumner Blvd	EAST of Capital Blvd	10,800	15,200
Oak Forest Rd	WEST of Capital Blvd	5,200	6,800
Oak Forest Rd	EAST of Capital Blvd	2,800	3,600
Spring Forest Rd	WEST of Capital Blvd	25,600	32,400
Spring Forest Rd	EAST of Capital Blvd	18,800	35,600
E Millbrook Rd	WEST of Capital Blvd	25,200	45,600
E New Hope Rd	EAST of Capital Blvd	23,200	39,600
US 401	NORTH of E New Hope Rd	42,000	59,200
E New Hope Rd	EAST of US 401	26,000	43,600
Calvary Dr	WEST of Capital Blvd	8,800	16,400
Calvary Dr	EAST of Capital Blvd	7,200	13,600
US 401	SOUTH of E New Hope Rd	35,600	48,000
Credit Union	EAST of US 401	1,600	2,000
US 401	EAST of Capital Blvd	30,000	42,400
New Hope Church Rd	WEST of Capital Blvd	16,800	33,600
Buffalo Rd	EAST of Capital Blvd	10,800	22,400
Greywood Rd	WEST of Capital Blvd	1,200	1,600
Greywood Rd	EAST of Capital Blvd	800	1,200
Old Buffalo Rd	WEST of Capital Blvd	2,400	2,800
Old Buffalo Rd	EAST of Capital Blvd	6,800	7,600
Mayflower Dr	WEST of Capital Blvd	1,600	2,000
Starmount Dr	EAST of Capital Blvd	4,000	4,400
Huntleigh Dr	WEST of Capital Blvd	6,400	13,200
Trawick Rd	EAST of Capital Blvd	8,800	13,200
Brentwood Rd	WEST of Capital Blvd	8,400	11,200
Brentwood Rd	EAST of Capital Blvd	14,800	19,200
I-440	WEST of Capital Blvd	132,400	204,800
I-440	EAST of Capital Blvd	114,000	194,400

Notes:

AADT - Annual Average Daily Traffic

Volumes are in vehicles per day (vpd)

Location	Type	Alternative Concepts
Capital Boulevard at Old Wake Forest Road	Grade Separation	1. Double Crossover Diamond Interchange 2. Diamond Interchange 3. Partial Cloverleaf Interchange
Capital Boulevard at Sumner Boulevard/Johnson Lexus Driveway	At Grade	1. Median U-turn Intersection 2. Restricted Crossing U-turn 3. Displaced Left-turn Intersection
	Grade Separation	1. Partial Cloverleaf Interchange 2. Double Crossover Diamond Interchange 3. Displaced Left-turn Interchange
Capital Boulevard at Oak Forest Road	At Grade	1. Displaced Left-turn Intersection 2. Median U-turn Intersection 3. Quadrant Roadway NW
Capital Boulevard at Spring Forest Road	Grade Separation	4. Diamond Interchange 5. Double Crossover Diamond Interchange 6. Partial Cloverleaf Interchange
Capital Boulevard at E Millbrook Road/N New Hope Road	Grade Separation	1. Double Crossover Diamond Interchange 2. Diamond Interchange 3. Partial Cloverleaf Interchange
Capital Boulevard at Calvary Road	Grade Separation	1. Partial Cloverleaf Interchange 2. Double Crossover Diamond Interchange 3. Diamond Interchange
Capital Boulevard at Buffalo Road/New Hope Church Road	Grade Separation	1. Double Crossover Diamond Interchange 2. Diamond Interchange 3. Displaced Left-turn Interchange
Capital Boulevard at Trawick Road/Huntleigh Drive	Grade Separation	1. Diamond Interchange 2. Double Crossover Diamond Interchange 3. Partial Cloverleaf Interchange
Capital Boulevard at Brentwood Road	Grade Separation	1. Partial Cloverleaf Interchange 2. Diamond Interchange 3. Double Crossover Diamond Interchange
Capital Boulevard at Westinghouse Road	Grade Separation	1. Partial Cloverleaf Interchange 2. Double Crossover Diamond Interchange 3. Diamond Interchange
Capital Boulevard at Highwoods Boulevard		



Crash Analysis

This Travel Profile includes a summary of crash data along the corridor. The data summary will inform a more in-depth analysis during the alternatives analysis phase of the study. The crash data illustrate the safety performance along the corridor and describe the severity of collisions that occurred at different locations in the study area. NCDOT provided crash data for the intersections along the corridor for a five-year period, from December 1, 2013 to November 30, 2018.

Crashes at several locations along the corridor were evaluated as shown in the table on pages 18 and 19. A total of 3,670 crashes were reported at these locations with 2,851 classified as property damage only (PDO) crashes and 795 classified as injury crashes. Of the 795 injury crashes, 19 were severe injury (Class A) crashes and five (5) were fatal crashes.

The I-440 Westbound Off-Ramp intersection entering Capital Boulevard was the site of the greatest number of crashes, with 345 PDO crashes and 60 non-fatal injury crashes (Class B and C). There was one severe injury (Class A) crash and no fatal crashes reported at this location during the study period. The intersections of Capital Boulevard

with Trawick Road/Huntleigh Drive, Calvary Drive, and Old Buffaloe Road had the highest percentage of severe/fatal within the corridor.

The severity index of the reported crashes is shown for each of the locations listed in the table. The statewide average of severity indices for roadways like Capital Boulevard is 3.87, as reported in the NCDOT Traffic Safety Unit 2015-2017 Three Year Crash Rate table. Locations where the reported crash severity exceeds the statewide average are marked in red.

Bicycle and pedestrian crashes are often the result of multiple factors related to street design, environmental conditions, or human error. Crash characteristics were reviewed to identify common themes for crashes throughout the Capital Boulevard North Corridor Study Area. The summary crash table below, previously shown in the Community Profile, compares bicycle and pedestrian crashes across the project segments, which are:

- Segment 1: I-440 to Huntleigh Dr/Trawick Rd
- Segment 2: Huntleigh Dr/Trawick Rd to New Hope Church Rd/Buffaloe Rd
- Segment 3: New Hope Church Rd/Buffaloe Rd to Millbrook Rd/New Hope Rd
- Segment 4: Millbrook Rd/New Hope Rd to I-540

	Segment 1		Segment 2		Segment 3		Segment 4		Total Crashes
Bicycle Crashes	4	10%	6	15%	24	60%	6	15%	40
Pedestrian Crashes	30	19%	26	17%	67	43%	32	21%	155
Total Crashes by Segment	34		32		101		38		195
Pedestrian Fatalities	2		3		4		0		9
Disabling Injuries	1 – bicycle 1 – pedestrian		2 – bicycle 2 – pedestrian		1 – bicycle 2 – pedestrian		0 – bicycle 1 – pedestrian		10

Location along Capital Boulevard		Total Crashes	Fatal Crashes
ID	Cross Street		
1	I-540 Eastbound Off-Ramp	226	0
2	I-540 Eastbound On-Ramp	78	1
3	Old Wake Forest Road	201	0
4	Sumner Boulevard/Johnson Lexus Driveway	66	0
5	Oak Forest Road	84	0
6	Trust Drive	24	0
7	Spring Forest Road	216	0
8	E Millbrook Road/N New Hope Road	261	0
9	Capital Crossing Driveway	7	0
10	Calvary Road	177	1
11	US 401 (Louisburg Road)	23	0
12	Deana Lane	100	0
13	Buffalo Road/New Hope Church Road	283	0
14	Greywood Drive	59	0
15	Old Buffalo Road	141	1
16	Hobby Court	19	0
17	Mayflower Drive/Starmount Drive	146	0
18	Capital Square Crossover	4	0
19	Trawick Road/Huntleigh Drive	236	1
20	Brewton Place/Old Trawick Lane	20	0
21	Brentwood Road	259	1
22	Westinghouse Road	173	0
23	Highwoods Boulevard	236	0
24	Baskin-Robins Crossover	37	0
25	I-440 Westbound On-Ramp	35	0
26	Appliance Court	15	0
27	I-440 Westbound Off-Ramp	406	0
28	I-440 Westbound Off-Ramp (US 1 South)	29	0
29	I-440 Westbound On-Ramp	1	0
30	I-440 Eastbound Off-Ramp	14	0
31	I-440 Eastbound Off-Ramp	6	0
32	Yonkers Road/Ratchford Road	88	0
Total		3,670	5

Class A Injury	Class B/C Injury	PDO Crashes	Severity Index (SI)	Statewide* Severity Index (SI) Average	Difference between SI and Statewide SI
1	45	180	2.81	3.87	-1.06
0	25	52	4.34	3.87	0.47
0	32	169	2.18	3.87	-1.69
0	12	54	2.35	3.87	-1.52
1	16	67	3.31	3.87	-0.56
0	10	14	4.08	3.87	0.21
0	52	164	2.78	3.87	-1.09
2	48	211	2.94	3.87	-0.93
0	1	6	2.06	3.87	-1.81
2	46	128	4.21	3.87	0.34
0	8	15	3.57	3.87	-0.3
0	20	80	2.48	3.87	-1.39
1	60	222	2.84	3.87	-1.03
1	17	41	4.42	3.87	0.55
2	24	114	3.87	3.87	0
1	2	16	5.77	3.87	1.9
0	33	113	2.67	3.87	-1.2
0	1	3	2.85	3.87	-1.02
2	60	173	3.84	3.87	-0.03
0	3	17	2.11	3.87	-1.76
0	66	192	3.18	3.87	-0.69
2	36	135	3.42	3.87	-0.45
2	56	178	3.40	3.87	-0.47
0	15	22	4.00	3.87	0.13
0	6	29	2.27	3.87	-1.6
0	2	13	1.99	3.87	-1.88
1	60	345	2.28	3.87	-1.59
0	10	19	3.55	3.87	-0.32
0	0	1	1.00	3.87	-2.87
0	2	12	2.06	3.87	-1.81
1	1	4	14.87	3.87	11
0	26	62	3.19	3.87	-0.68
19	795	2,851	-	-	-

- Spring Forest Connector Trail: off-road paved path to connect Beaverdam Creek Greenway to the Spring Forest Trail near Sumner Boulevard.
- Greenway near Triangle Town Center: proposed off-road multi-use path from Triangle Town Boulevard near Town Drive to Perry Creek to Spring Forest Trail.

The Travel Profile evaluates existing conditions and the impact on multimodal travel and connectivity within the Capital Boulevard Study Area. The analyses conducted may be used to better understand where bicycle and pedestrian facilities should be prioritized and the type of infrastructure that may be most appropriate for attracting users of all ages and abilities.

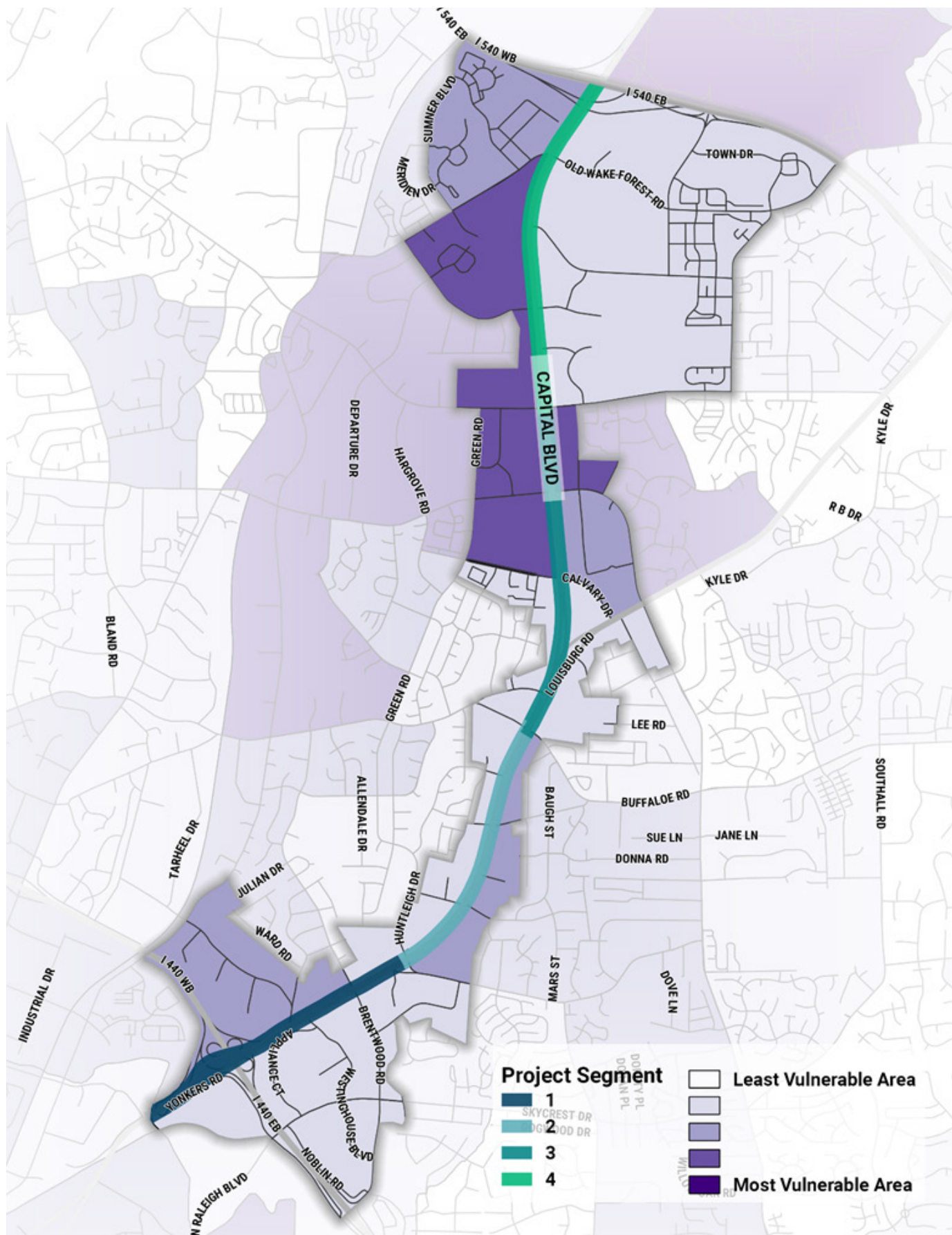
Equity Analysis

Although the Capital Boulevard corridor is more notably home to a mixture of commercial uses, there are several neighboring residential communities that shop, commute, or work along this thoroughfare on a daily basis. An equity analysis was used to understand where vulnerable households are most common along the corridor. The results of this analysis are illustrated on the map on page 21, which shows the concentration of vulnerable households.

The term “vulnerable” in this analysis signifies that a



Zero Car Households	Percentage of households within each Census Block Group without access to a vehicle. Households that do not own or have access to a vehicle may have trouble accessing community facilities and other resources; they may benefit more by having access to safe, connected routes for bicycling and walking.
Vulnerable Populations	Percentages of people within each Census Block Group over 65, under 18 and below the poverty line. Underserved or vulnerable communities often bear a disproportionate burden of transportation externalities (traffic, lack of choice, etc.). These groups can often benefit significantly by having non-motorized or public transportation options.

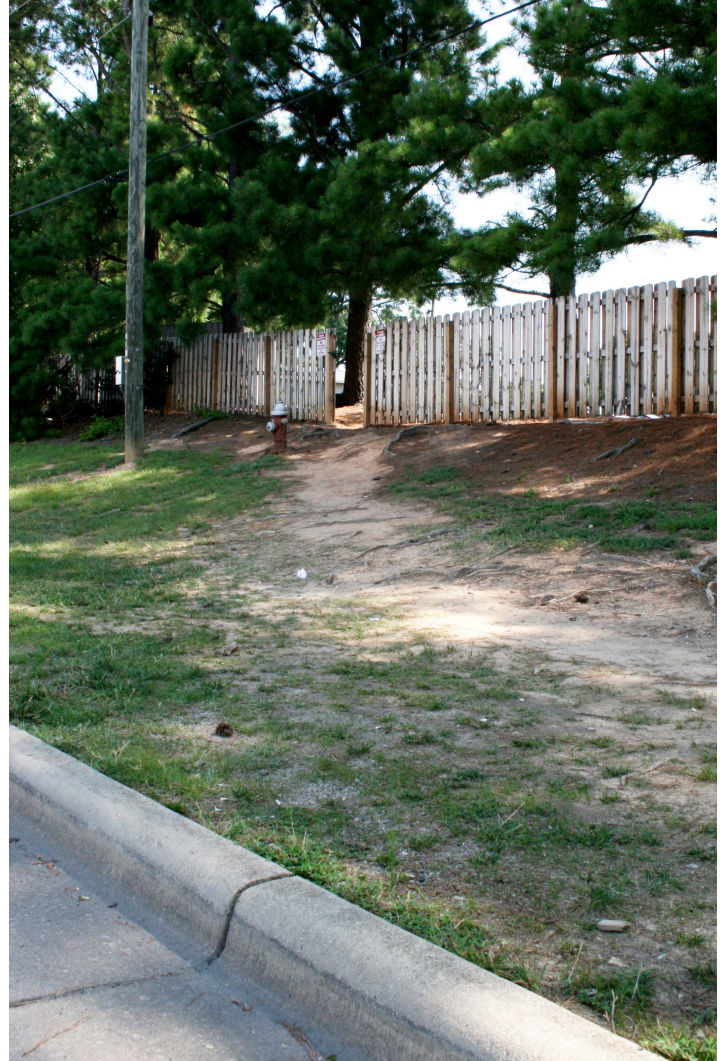


Bicycles and Pedestrians

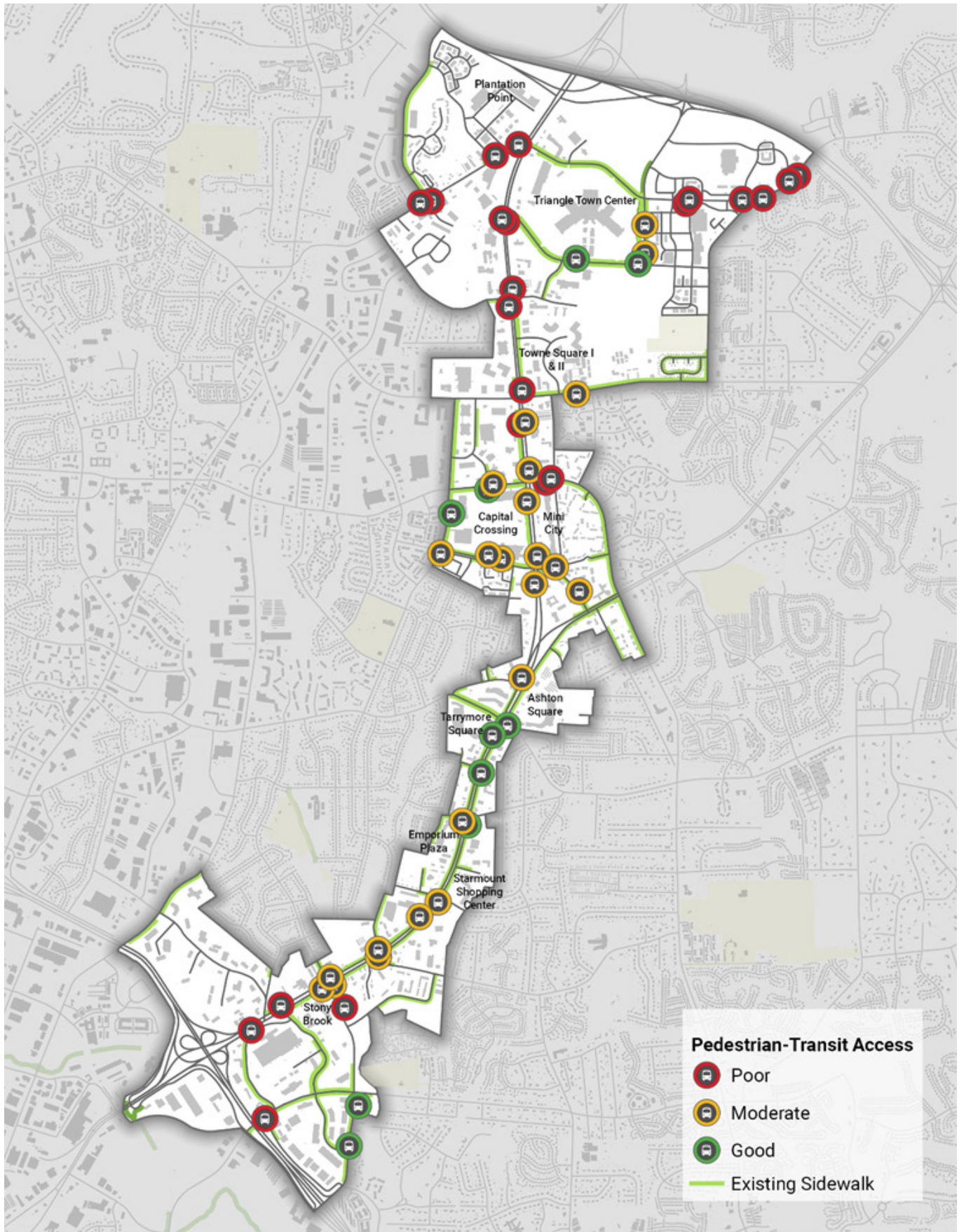
Pedestrian Access

A specific analysis was completed to assess the level of pedestrian access to transit stops, ranking the access as poor, moderate or good and also highlighting sidewalk connectivity to key destinations along the corridor. This analysis used the existing transit stops and sidewalk data to calculate a ratio of sidewalk completeness surrounding each stop. An eighth of a mile was used as a buffer for each stop to provide a more detailed sidewalk access score for individual bus stops.

While there are over 80 transit stops across Capital Boulevard and the surrounding study area, not all stops are equally accessible to pedestrians. "First-and-last mile" connections are used to describe the beginnings and endings of trips where pedestrians are walking to/from a transit stop to their end destination. For a study area this size, the travel profile analyzed the pedestrian connectivity within a 1/8th mile radius around each stop.



Well Connected Stops	Sidewalks exist on both sides of many or all the streets within 1/8 th of a mile of the stop
Moderately Connected Stops	Sidewalks exists on both sides of some of the streets or only on one side of the street within 1/8 th of a mile of the stop
Poorly Connected Stops	Sidewalks are intermittent or do not exist on either side of the streets within 1/8 th of mile of the stop



Bicycle Level of Stress Analysis

Level of Traffic Stress (LTS) is a qualitative indicator of the stress felt by a bicyclist based on the characteristics of the bicycle facility and adjoining street. This analysis includes a variety of factors including the speed limit, the type of street, the existing bicycle and pedestrian infrastructure (i.e., shared use paths, bike lanes, etc.), and the number of travel lanes.

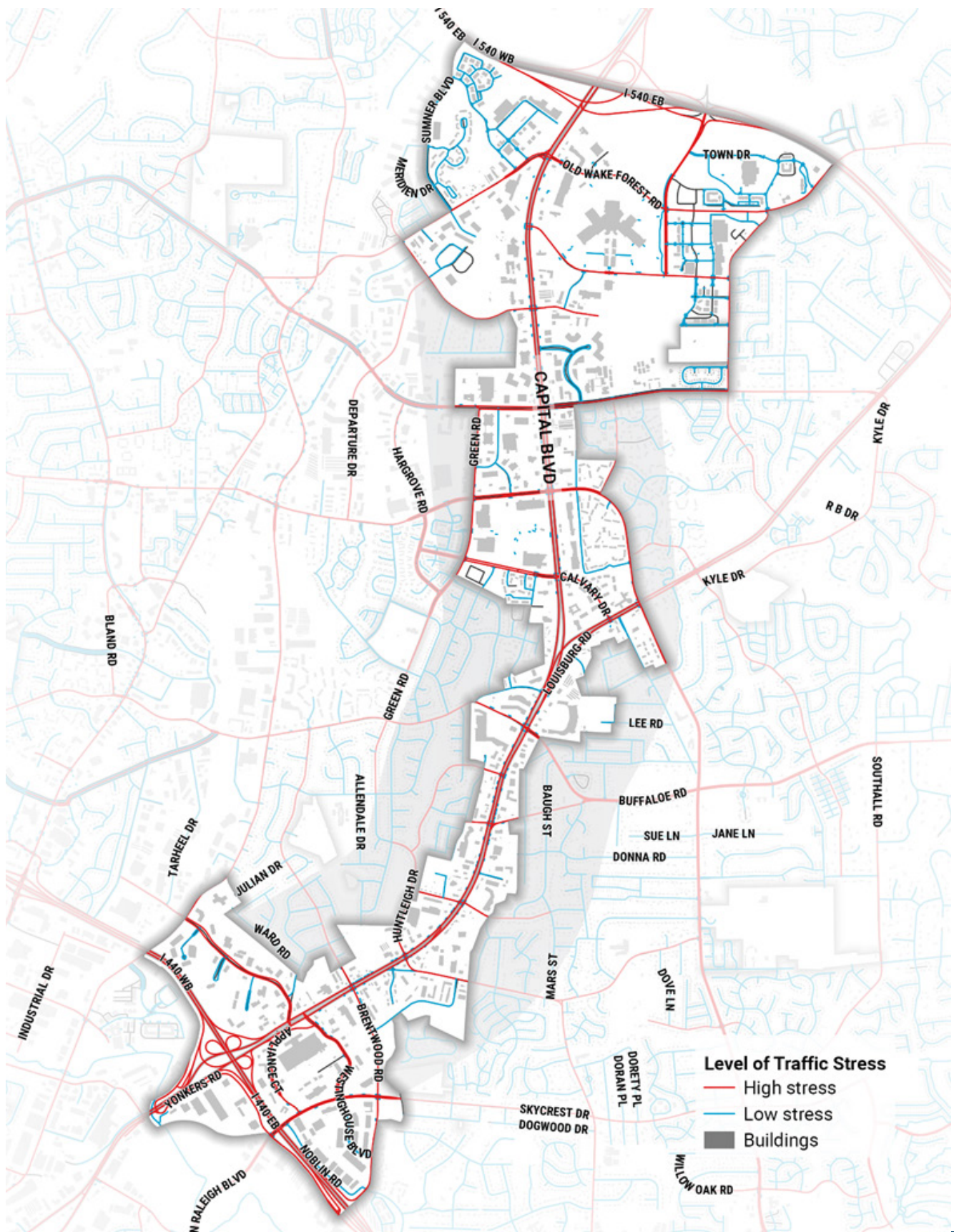
Two classifications were used to describe the area's level of stress. "Low Stress" indicates a more comfortable riding environment that is appropriate for most ages and abilities. These streets are characterized by lower traffic speeds (30 mph or less) and two or three travel lanes.

"High Stress" indicates riding environments that are less comfortable and potentially unsafe for bicycle traffic. Streets that are only fitting for the most advanced levels of bicyclists—those who identify as "highly confident" riders—are considered "High Stress". Speeds on these streets exceed 30 mph, and there are multiple travel lanes in each direction.

Some high stress streets are not suitable for bicycle traffic at all due to a lack of dedicated bicycle facilities, dangerous intersections, and high traffic volumes. Capital Boulevard and Louisburg Road are generally not suitable for cycling within the study area.

While LTS is not necessarily reflective of all cyclists' experience on each segment, it serves as a basic measure of how the street network supports mobility for people on bicycles. The map on page 27 illustrates the stress scores for streets within the study area.





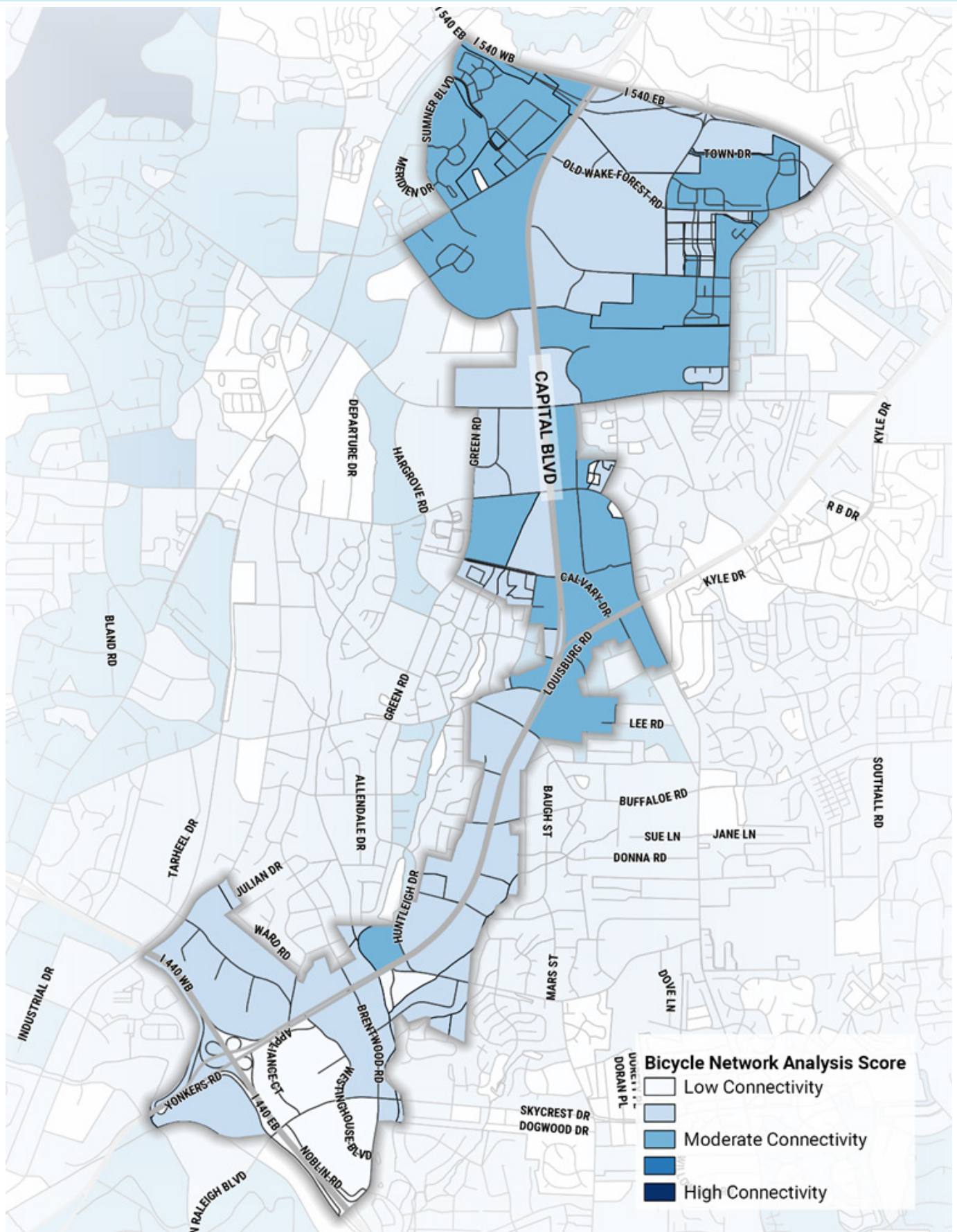
Bicycle Connectivity

A bicycle connectivity analysis was conducted within the study area along the Capital Boulevard corridor. This analysis—Bicycle Network Analysis (BNA)—measures connectivity of a community's existing transportation network to key destinations within a study boundary from the bicyclists' perspective.

The BNA summarizes the number and types of destinations available in each census block, including population, opportunities (jobs and education), core services, recreation, retail, and transit. Pairing this information with the knowledge of which census blocks are connected by streets identified as low-stress, the BNA tool calculates a score for each census block by comparing the number and type of reachable destinations on the low-stress bicycle network to the destinations accessible by car within the same distance.

The BNA tool was used to illustrate connectivity along the corridor and can be used to compare how recommended bikeway changes could increase overall bicycle network connectivity and access. This information provides valuable guidance for strategic implementation and facility selection. The following map provides the results of the BNA connectivity scores for the census blocks along the corridor.





Transit

Capital Boulevard is served by a number of transit routes in the study area, including both GoRaleigh and GoTriangle service. The northern portion of the study area is crossed by multiple routes connecting to destinations east and west of the corridor. In addition, north-south mobility is available parallel to the corridor on the east and west sides.

Numerous transit stops exist along Capital Boulevard, with varying degrees of amenities including covered shelters and benches. The concentration of commercial uses on Capital Boulevard makes it a draw for workers and shoppers travelling by transit, including individuals

in households without access to a personal vehicle. Transit on the corridor also provides a connection between Downtown Raleigh and points north of I-540, such as the Town of Wake Forest.

GoRaleigh routes that serve the corridor include:

- 1 - Capital
- 23L - Millbrook Connector
- 24L - North Crosstown Connector
- 15L - Trawick Connector
- 25L - Triangle Town Center Connector

GoTriangle routes that serve the corridor include:

- 201 - North Raleigh-RTC
- WRX - Wake Forest-Raleigh Express

GoRaleigh provides paratransit service along the corridor and within the study area.

Potential BRT Stop Locations	Boardings by Location*	Percent of Boardings
Triangle Town Center	424	28%
Sumner Boulevard	36	2%
Old Forest Drive	20	1%
Spring Forest Road	177	12%
E Millbrook Road / N New Hope Road	146	10%
Calvary Drive	247	17%
New Hope Church Road / Buffaloe Road	74	5%
Old Buffaloe Road	72	5%
Starmount Drive	74	5%
Old Trawick Lane	168	11%
Highwoods Boulevard	56	4%

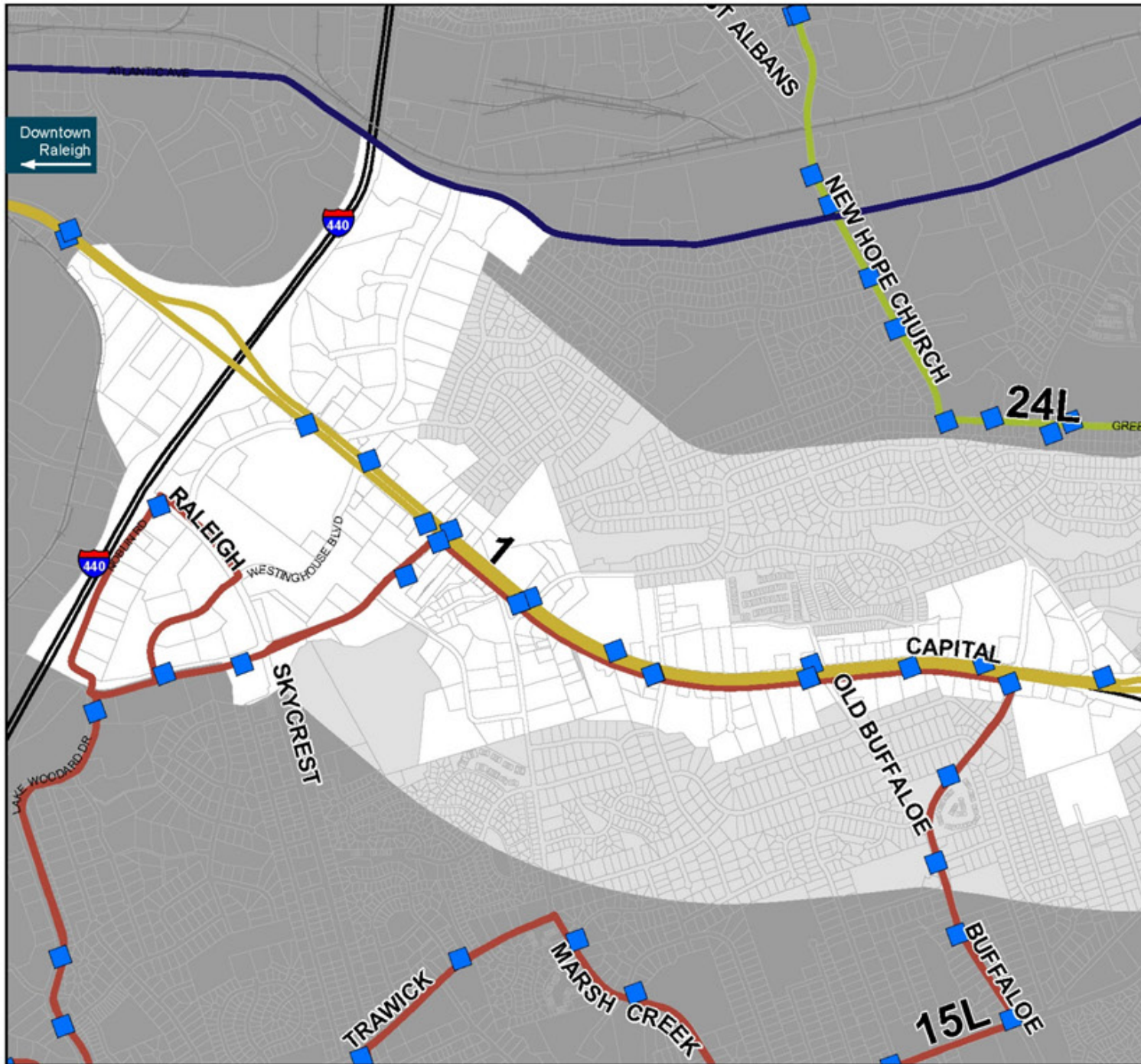
Future Transit

The Wake County Transit Plan envisions four “big moves” to connect the region, connect all Wake County communities, and enhance urban mobility. The four big moves include:

- Connect Regionally
- Connect All Wake County Communities
- Frequent, Reliable Urban Mobility
- Enhanced Access to Transit

The plan includes BRT service and infrastructure improvements along Capital Boulevard between downtown Raleigh and I-440. All-day frequent local bus service along the Capital Boulevard North Corridor between I-440 and Triangle Town Center is another component of the plan. Future planning efforts may identify adding enhanced transit service to the Capital Boulevard North Corridor, which could include infrastructure changes, improved bus stations, and other service changes.





Transit

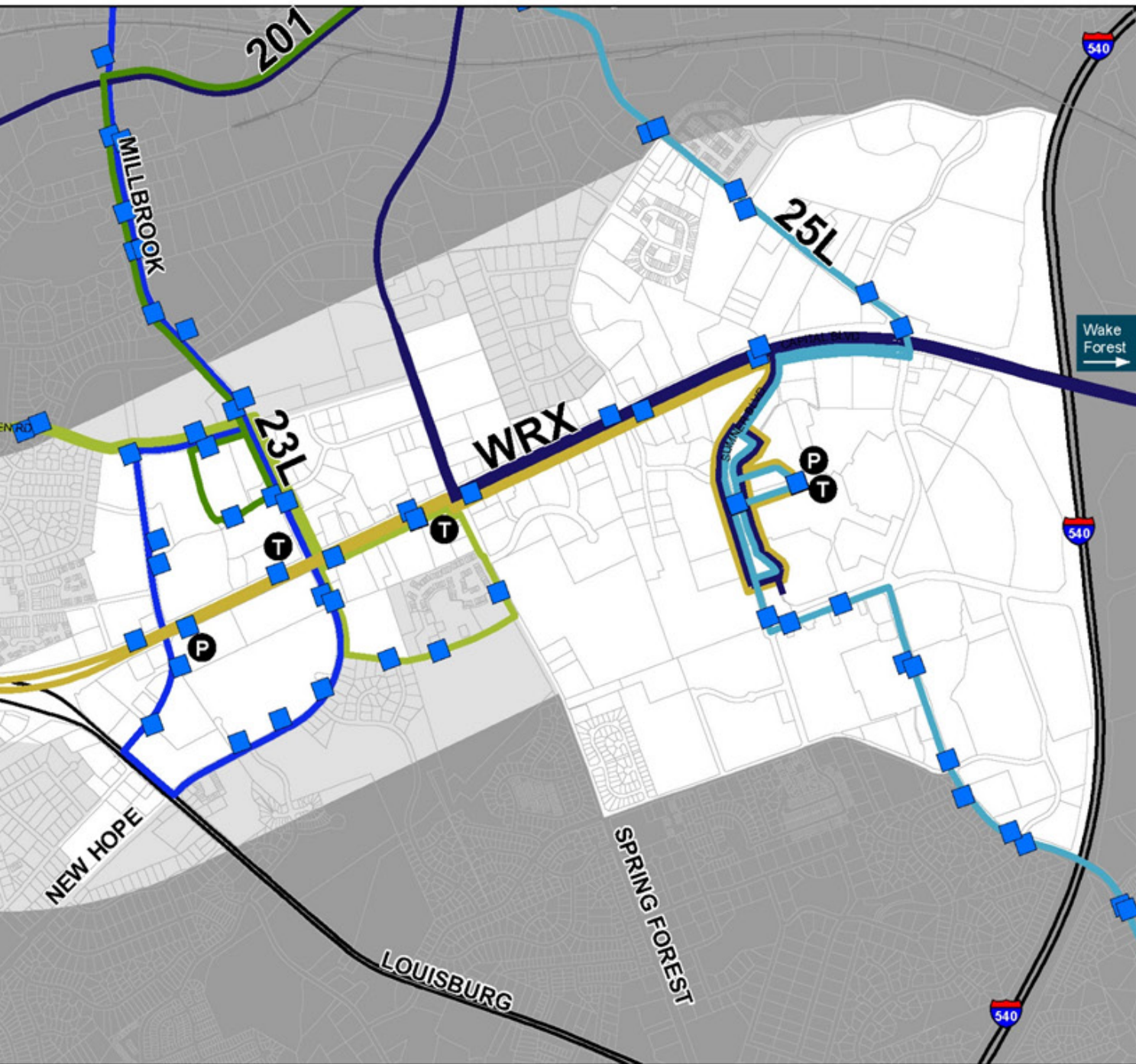
GoRaleigh Routes

- 1 - Capital
- 23L - Millbrook Connector
- 24L - North Crosstown Connector
- 15L - Trawick Connector
- 25L - Triangle Town Center Connector

GoTriangle Routes

- 201 - North Raleigh-RTC
- WRX - Wake Forest-Raleigh Express

- T Transfer Point
- P Park and Ride
- Transit Stops
- Railroads
- Study Area
- Area of Influence



Existing Plans

The Summary of Existing Plans report looked at all existing plans and their recommendations for the Capital Boulevard North area. One major existing plan is the 2045 Metropolitan Transportation Plan (MTP). This comprehensive regional transportation plan is coordinated by two organizations charged with transportation decision-making in the Research Triangle Region: the Capital Area Metropolitan Planning Organization (CAMPO) and the Durham-Chapel Hill-Carrboro Metropolitan Planning Organization (DCHC MPO). The most recent publication date for this plan is February 19, 2018.

The MTP catalogs highway, public transportation, bicycle, pedestrian, and other transportation projects to be implemented over the next 25 years to address future travel demand and economic development. The multi-year process to arrive at an adopted MTP involves developing goals and objectives, alternatives, and a preferred set of options, all with numerous public involvement efforts.

Any project that is to be submitted for potential state or federal funding is expected to be in the MTP. The Capital Boulevard North Corridor study will use the MTP to guide and inform the study process. The study will assume that MTP projects will be implemented, but projects within the study area may be modified based on the more detailed analysis informing this corridor study, and to better meet the vision and goals for this study.

Projects from the MTP are used in the Triangle Regional Model (TRM) for forecasting future travel demand. Not all projects with the MTP are included in the TRM. Specific MTP 2045 projects that are within or surround the project study area are listed below:

- US 1 North from I-540 to Thornton Road (2025): proposed eight-lanes, widening, part of Comprehensive Transportation Project (CTP).
- New Hope Church Road from Green Road

to Deana Lane (2025): proposed three-lanes, widening, part of Comprehensive Transportation Project (CTP).

- Old Wake Forest Road from Litchford Road/ Atlantic Boulevard to Capital Boulevard (2025): proposed four-lanes, widening, part of Comprehensive Transportation Project (CTP).
- Six Forks Extension from Atlantic Avenue to Capital Boulevard (2035): proposed four-lanes extending Six Forks Road to connect with Capital Boulevard- new roadway, part of Comprehensive Transportation Project (CTP).
- Capital Bus Rapid Transit (BRT): from Moore Square to Triangle Town Center.
- Commuter Transit Rail: from Apex to Youngsville running parallel to Atlantic Avenue.
- Sumner Boulevard extension from Old Wake Forest Road to Capital Boulevard (2035): proposed four-lanes at a new location.
- Marsh Creek/Trawick Median from Capital Boulevard to New Hope Road (2025): proposed three-lanes, turn lane.
- Atlantic Avenue Widening from Highwoods Boulevard to New Hope Church Road (2025): proposed to continue as four-lanes, transportation system management (TSM).
- Dixie Forest Road from Spring Forest Road to Atlantic Avenue (2025): proposed three-lanes, widening.
- Six Forks Road from Ramblewood Road to Lynn Road (2025): proposed six-lanes, widening.
- Skycrest Drive from Brentwood Road to New Hope Road (2035): proposed four-lanes, widening.
- Litchford Road from Old Wake Forest Road to Falls of Neuse Road (2035): proposed four-lanes, widening.
- N.W. Regional Center from Ruritania to Gresham Lake Road to I-540 (2035): proposed four-lanes, no existing lanes, widening.

- Spring Forest Road from Fox Road to US 401 (2035): proposed four-lanes, widening.
- Fox Road from Old Wake Forest Road to US 401 (2035): proposed four-lanes, widening.
- Fox Road from Spring Forest Road to Old Wake Forest Road (2045): proposed three-lanes, turn lane.
- East Coast Greenway: proposed off-road paved trail from Rocky Branch Trail near South Saunders and Jamaica Drive to near Windsor Drive and Forestville Road (Wake Forest).
- Brentwood Drive: recommends a bicycle only lane from New Hope Church Road to Raleigh Boulevard/Skycrest Drive.
- New Hope Church Road: recommended bicycle only lane from Brentwood Road to Capital Boulevard.
- Green Road: proposes a bicycle only lane from New Hope Church Road to Spring Forest Road.
- Buffaloe Road: proposed bicycle only lane from Buffaloe Road near Capital Boulevard to Horton Road.
- Beaverdam Creek Greenway: proposed off-road multi-use greenway trail from near Spring Forest Road to Neuse River.
- Spring Forest Road: recommended bicycle only lane from Sandy Forks Road to Green Road.



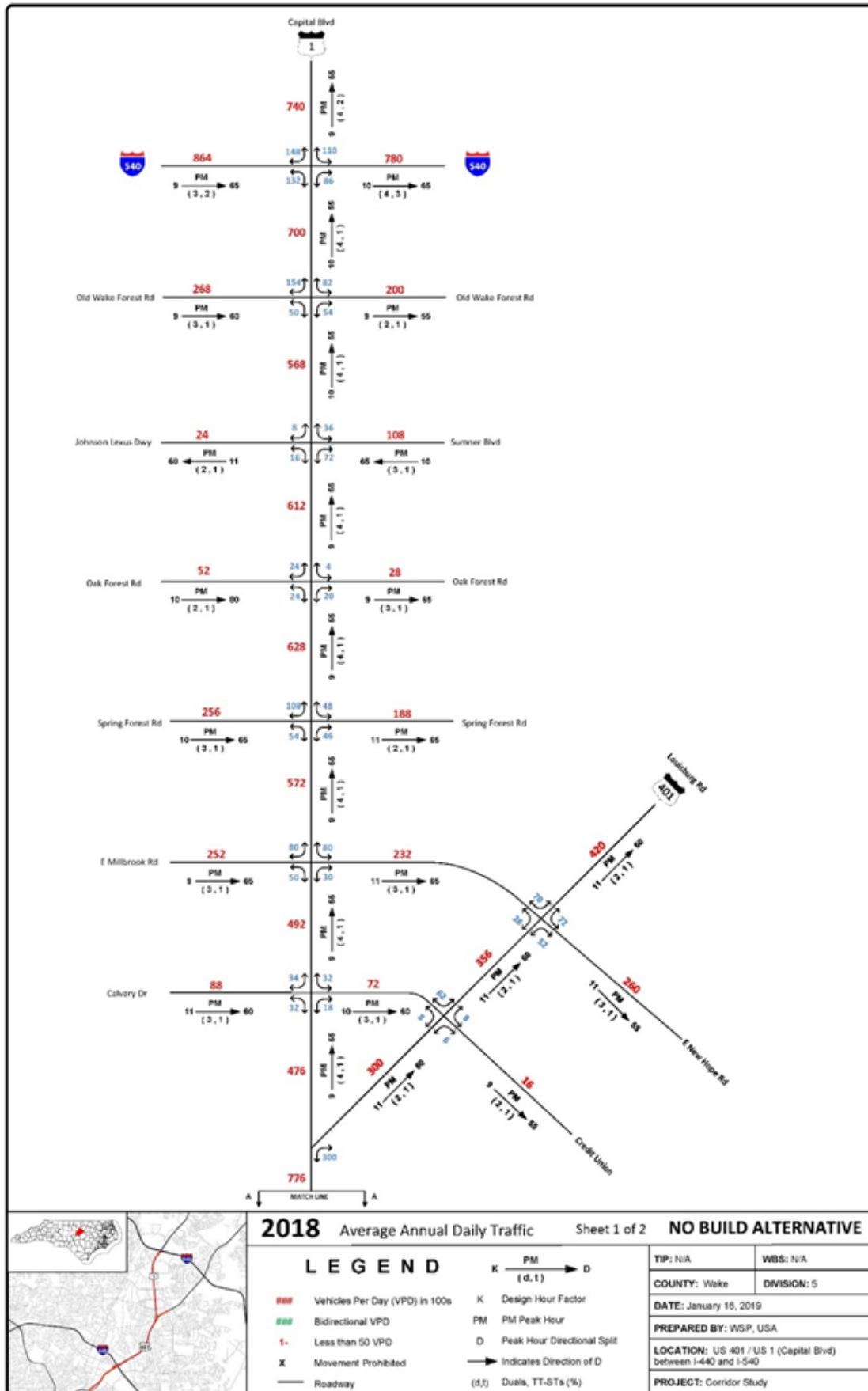


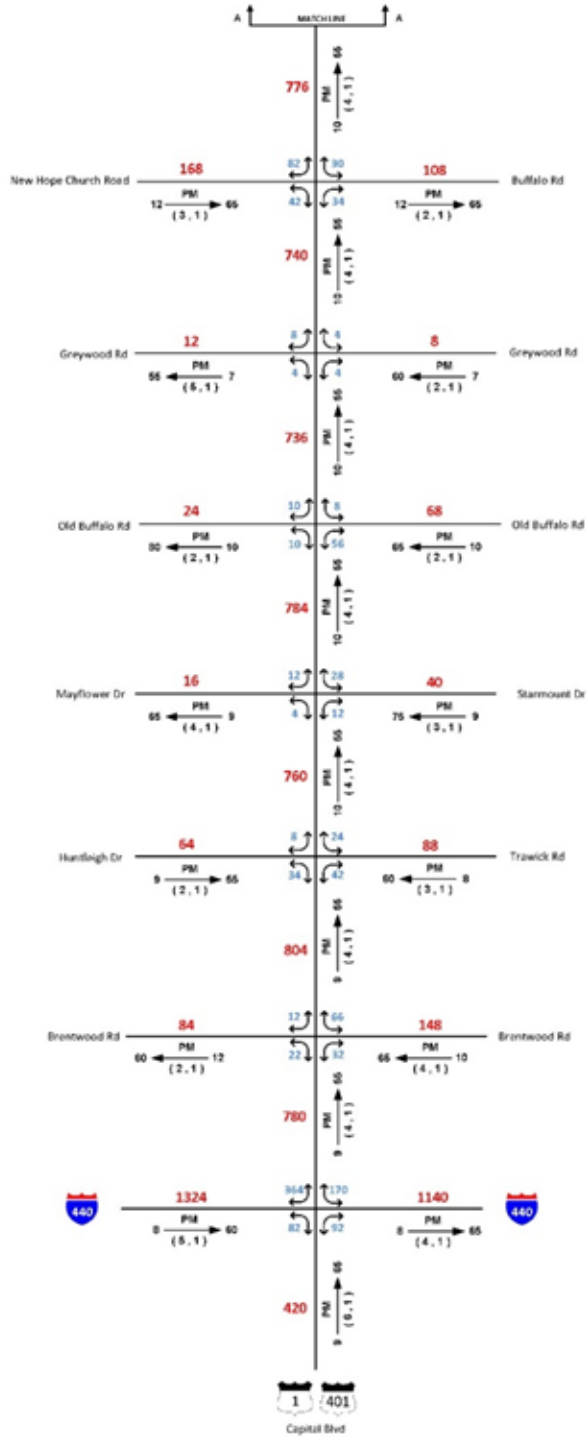
Capital Blvd North

Corridor Study

CITY PLANNING







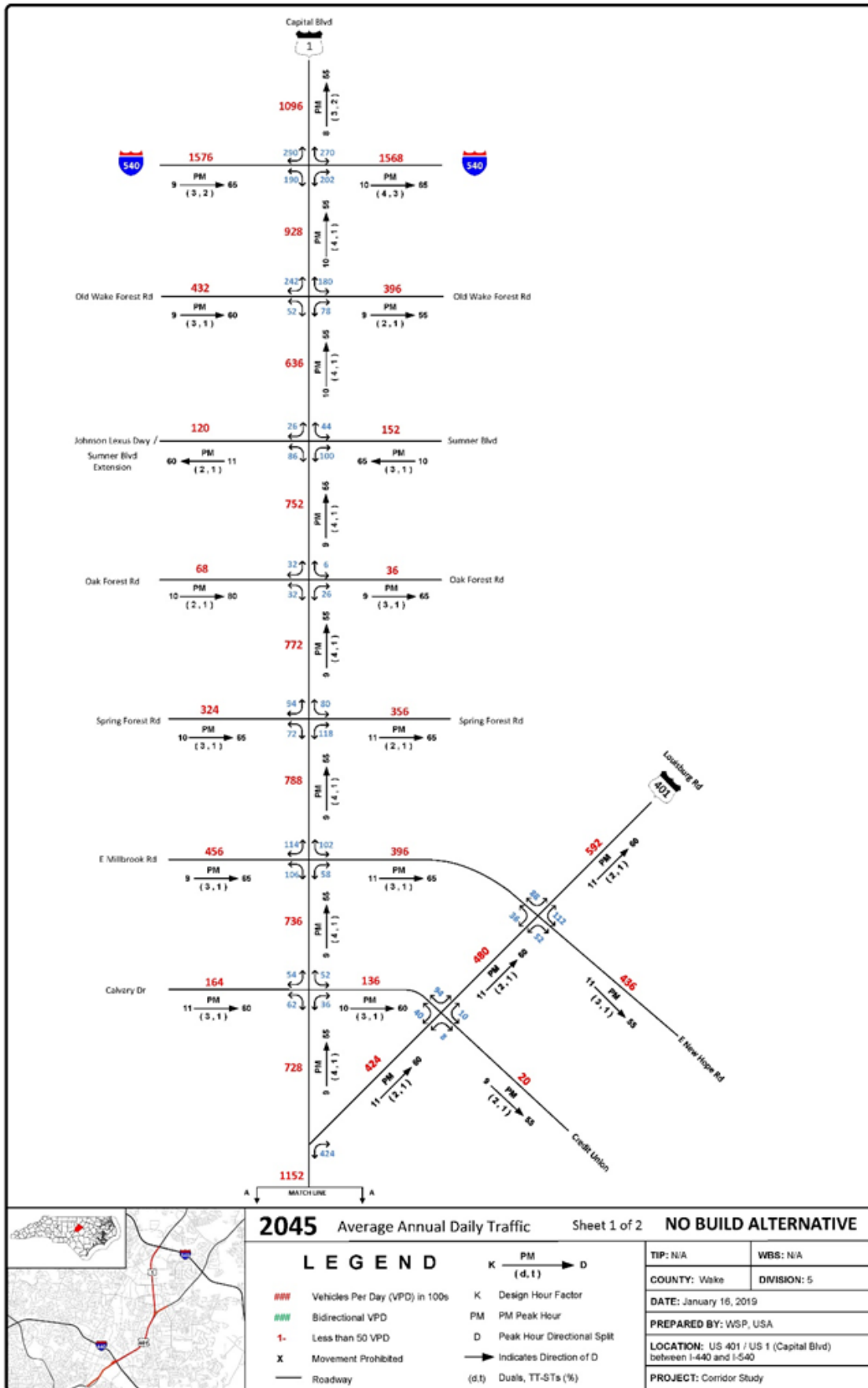
2018 Average Annual Daily Traffic Sheet 2 of 2 NO BUILD ALTERNATIVE

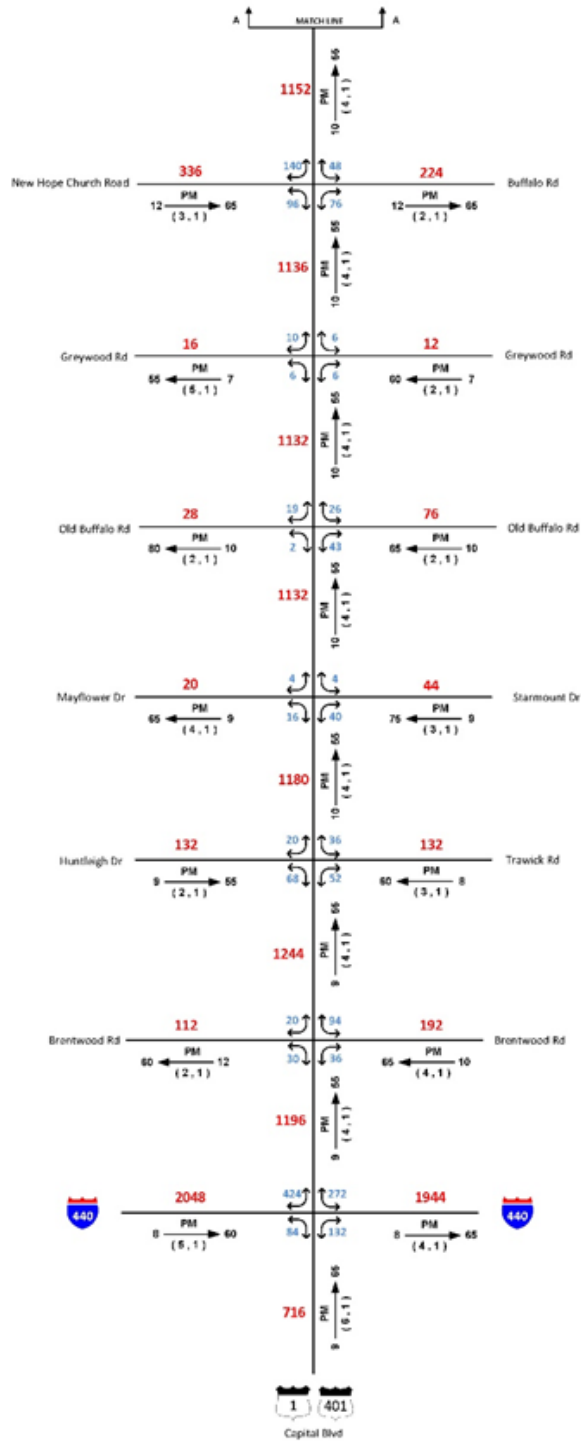
LEGEND

- Vehicles Per Day (VPD) in 100s
- Bidirectional VPD
- 1- Less than 50 VPD
- X Movement Prohibited
- Roadway

- $K \xrightarrow{\text{PM}} D$
(d, t)
- K Design Hour Factor
- PM PM Peak Hour
- D Peak Hour Directional Split
- \rightarrow Indicates Direction of D
- (d,t) Duals, TT-STs (%)

TIP: N/A	WBS: N/A
COUNTY: Wake	DIVISION: 5
DATE: January 16, 2019	
PREPARED BY: WSP, USA	
LOCATION: US 401 / US 1 (Capital Blvd) between I-440 and I-540	
PROJECT: Corridor Study	





2045 Average Annual Daily Traffic

Sheet 2 of 2

NO BUILD ALTERNATIVE

TIP: N/A	WBS: N/A
COUNTY: Wake	DIVISION: 5
DATE: January 16, 2019	
PREPARED BY: WSP, USA	
LOCATION: US 401 / US 1 (Capital Blvd) between I-440 and I-540	
PROJECT: Corridor Study	